CLIMATE CHANGE ADAPTATION FRAMEWORK- LCCAP
MUNICIPALITY OF SANTA FE, CEBU PROVINCE

1. CLIMATIC STIMULI, HAZARDS IMPACTING MUNICIPALITY OF SANTA FE

During the Suitability Mapping of Cebu Province, a municipality-level downscaling of climate variables was conducted. Monthly projected temperature and precipitation for 2020 and 2050 in each municipality in Cebu were derived. In this downscaling process the average of the results from the ECHAM 5, UKMO-HADCM3, and IPSL-CM4 Global Climate Models was taken. The downscaling method used is 'Delta' (Ragub & Neussner, 2013) as presented in attached files.

The suitability mapping and downscaling summarized the climatic hazards for Santa Fe as follow

- Extended hot months by 2050s from May through September to April to October, with estimated increase of mean temperature by +1.5C by the end of 2050s with up to 65% increase in number of days above 35°C 2020 to 2050 under medium emissions scenarios
- Estimated increase of annual precipitation by about 5% by 2050s under A1B and A2 scenarios, with increased precipitation of 12-16% between June and August and reduced precipitation of up to 10% between February and April, resulting in a "dryer" dry season in 2050s and a wetter and prolonged wet season in 2020s and 2050s
- Ocean temperature has been calculated to be increasing at 0.201°C/decade x Sea level rise is increasing at 5.4 cm/decade

This results in a range of hazards: intensive monsoon rains, more violent typhoons, flooding in the wet season and extended drought and heat in the dry season, sea level rise in low lying areas of the municipality, SALT WATER INTRUSION IN LOWLYING AREAS, and coastal storm surge. These climatic hazards impact water availability throughout the island municipality, food and livelihoodinsecurity and flood risks and coastal inundation risk low lying barangays.

Based on a process of climate and disaster risk mapping at village level, municipal wide climate risk analysis and impact chain analysis, Santa Fe villages, Municipal actors and Local Government recognize that the most critical climate change stimuli and potential hazards for their municipality are those associated with slow on-set events particularly

- Extended hot months by 2050s from May through September to April to October, with estimated increase of mean temperature by +1.5C by the end of 2050s with up to 65% increase in number of days above 35°C 2020 to 2050
- Estimated reduced precipitation of up to 10% between February and April, resulting in a "dryer" dry season in 2050s
- Additionally, rapid onset flooding of low lying areas between June and August as a progressive risk in 2020 and 2050

Resulting in extended dry season, drought and extreme heat, and impact on water availability in Santa Fe, this is recognized as most critical for Santa Fe as it supports basic needs of water, foods security and livelihoods of 100% of the population and has greatest vulnerability as evaluated by the local government, villages and stakeholders of Santa Fe through analysis of exposure, sensitivity and level of

adaptive capacity. Other systems of interest reviewed by Santa Fe include, people, ecosystem, livelihoods and infrastructure.

EXCERPT FROM CHAPTER 3 OF THE DRAFT LCCAP USING THE 2018 PAGASA CLIRAM PROJECTION

VULNERABILITY & ADAPTATION ASSESSMENT RESULTS

GEOLOGICAL HAZARD ASSESSMENT

The fact that the world is warming up is indisputable. Effects of climate change has been evident – changes in seasonal patterns; increase in global temperature; changes in rainfall patterns; changes in the frequency of extreme weather events, extreme rain events that most like cause landslides and mudslides; sea level rise and ocean acidification associated with intrusion of saltwater into water sources and agricultural areas. These effects cause destruction in properties, land and marine environment and human lives.

PAGASA has already issued an "Observed Climate Trends and Projected Climate Change in the Philippines by the DOST and PAGASA recently (2018) to guide the public and various government and non-government agencies in different planning initiatives relative to climate change and disaster risk reduction and management.

The following key findings are stated in the compilation of outputs from various workshops at the community/barangay and municipal levels which the planning management team has related the climate vulnerabilities and their impacts to various sectors in the municipality of Santa Fe:

TEMPERATURE.

The observed temperature in the country is warming at an average rate of 0.1°C per decade. Climate projections suggest continuous warming at a faster rate in the future. It is projected that the country-averaged mean temperature could increase by as much as 0.9°C -1.9°C (assuming the moderate emissions scenario, RCP4.5) and 1.2°C-2.3 °C (considering the high emission scenario, RCP8.5) in the mid-21st century (2036-2065). Warmer conditions are further expected by the end of the 21st century (2070-2099), which could range from 1.3°C-2.5°C (based on RCP4.5) to 2.5°C-4.1°C (based on RCP8.5) increase in mean temperature relative to t baseline climate[1]

INCREASED AVERAGE TEMPERATURE, EXTREME HEAT, DECREASED AVERAGE RAINFALL IN THE DRY SEASON (RESULTING TO STORM SURGES, SEA LEVEL RISE AND SALTWATER INTRUSION)

Economy. Fishery, farming and tourism are the sources of livelihood of majority of the people of Santa Fe.

Increase in temperature and longer and drier summer reduce the duration of the planting season to probably one cropping only per year during El Nino thereby resulting to low economic gains for the locals. With the changes in seasonal patterns, agricultural productivity is affected and family income declines. In addition, farmers need to provide more water to their crops and livestock when water is scarce due to lower ground water tables and hotter temperature. Additional expenses for the water system are required or more effort and time have to be exerted to extract water from deep and dug wells. Diversity of pests during long hot dry seasons will mean higher cost for pesticides. The local farmers have also observed increase in army worm and locust infestation in farms during long dry seasons. More damaging result is the loss of arable lands.

[1] **"Observed Climate Trends and Projected Climate Change in the Philippines by the DOST and PAGASA recently (2018)**

Although long hot season means there will be longer period for local and foreign tourists to spend their time in Santa Fe and higher economic gains for the locals, the business sector needs more volume of water for drinking and cleaning.

Increase in acidity of sea water due to hot temperature affects families who are into seaweed farming. Seaweed farmers reported the occurrence of ice-ice disease in seaweeds forcing farmers to harvest their produce earlier than schedule.

Since the increase in temperature results to the melting of ice glaciers at the Artic and Antarctic Regions, sea level is fast rising reaching ang even destroying areas and structures that were once at or outside the 20-meter zone along the coasts. Storm surges during typhoon also affects these coastline areas and structures.

Social. Effects on health of drought, increase in temperature and longer drier summer are: spread of skin diseases, heatstroke, increase in mosquito-borne diseases like dengue fever and rise in chronic conditions like asthma. Indirect result of increase in temperature is the difficulty of sending children to school due to loss on income. Children below 5 years old, PWDs and senior citizens are more vulnerable to such health issues. These inputs were provided during the workshop with department heads of various municipal service sectors and other stakeholders.

Environment. Drought and longer drier summer result to withering of plants in the wetlands, mangrove areas, upland forests and other forms of vegetation resulting to open spaces, decrease in natural water barriers, decrease in wildlife population and soil erosion. Based on a report entitled "*Planet Earth, Effects of Global Warming"* written by Alina Bradfort and Stephanie Pappas, August 12, 2017; too warm water and unbalanced pH /pollution stress coral reefs resulting to coral bleaching since more and more carbon dioxide in the ocean makes the sea water more acidic. Eventually, coral reefs are expected to be increasingly rare due to coral bleaching. Sea level rise cause by high temperature also causes erosion of shorelines that results to destabilization of coastlines. Erosion of shorelines damaging blocking trees and vegetations, allows strong surges to penetrate land.

Infrastructure. As per Bureau of Fire Protection (BFP), fire is more rampant during summer season therefore longer drier season means the possibility of human induced and bush fires is higher. Infrastructures and other public facilities like barangay halls, health centers, daycares, elementary schools, and others are prone to damage if located along the shorelines. The local government, as a result, shall need to provide temporary areas where public service of concerned departments can carry on with their activities. Destabilization of coastal areas due to erosion cause risk to properties and life.

Other systems of interest reviewed by Santa Fe include, people, ecosystem, livelihoods and infrastructure.

Water Source. Variation in temperature ranges from extended dry season, drought and extreme heat that results on significant impact on water availability in Santa Fe. Accessibility to potable and clean waters is recognized as most critical for Santa Fe as it supports basic needs of water, foods security and livelihoods of 100% of the population and has greatest vulnerability as evaluated by the local government, villages and stakeholders of Santa Fe through analysis of exposure, sensitivity and level of adaptive capacity. Salt water intrusion affects water sources (further information from the Water Resource Study conducted by CordAid is presented in the succeeding pages). Fresh water sources nearest to the coast are most vulnerable to saltwater intrusion.

Majority of the Santa Fe households rely on fishing and farming for their source of living. With no irrigation system to support agricultural areas during long hot seasons, farmers will have to plant crops once or twice a year instead of the regular thrice to four times a year thereby decreasing their annual income. Water sources like springs and deep wells may either dry up or become salty. Water reserves in water collectors may not be able to hold enough water to sustain domestic and agricultural needs.

Based on the Participatory Disaster Risk Assessment (PDRA) that covered all 10 barangays, drought and hotter summer will affect all areas due to shortage of potable and fresh water. Locals observed that dry season arrives earlier than before - hot season was from April to May years before but now it occurs February to May.

RAINFALL.

Increasing trends in annual and seasonal rainfall were observed in many parts of the country. Such trends were found to be associated with extreme rainfall events. Multi-model projections suggest a range of increase and decrease in seasonal-mean rainfall exceeding 40% of its historical values. Nevertheless, the multi-model central estimate of projected changes in rainfall could be within the natural rainfall variations, except for the projected rainfall reduction over central sections of Mindanao that are beyond the observed rainfall variations in the past.

LONG RAINY SEASONS AND INCREASED RAINFALL DURING WET SEASON, CHANGING RAINFALL PATTERNS AND DECREASED SEASONAL-MEAN RAINFALL

This type of climate vulnerability results in a wide range of hazards namely; intensive monsoon rains, flooding in the wet season, sea level rise in low lying areas of the municipality, salt water intrusion in low lying areas, and coastal storm surge.

Economy. Continuous rain and heavy monsoons cause flooding of agricultural, residential and business areas resulting to damage to crops and properties. Changing rainfall patterns and increased rainfall results to early or late (adjustment of) planting of crops. Farmers, during increased rainfall, need to harvest their crops earlier than schedule thereby decreasing their income. Fishermen cannot go to sea to glean for seashells and other marine resources and to catch fish during strong rains and storms. As a result of continuous rain and flooding, farmers usually to elsewhere to look for better livelihood opportunities. With longer rainy season, a smaller number of tourist guests who come to enjoy the sun and sea are expected to visit Santa Fe hence income from tourism business decreases.
Social. Although flooding is not an issue since Santa Fe soil quality easily allow water to seep in. Barangay Balidbid is of low ground elevation causing water stagnation for a period of time. Longer wet season affects vulnerable individuals' health conditions – water-borne and pulmonary diseases are more rampant. These climatic hazard impact water availability throughout the island municipality, food and livelihood insecurity. With livelihood insecurity; support to education, nourishment and daily needs are affected. Decrease in farming and fishery harvest result to higher cost of agricultural products.
Environment. Siltation at mangrove areas and along shores covers and kills marine products and plants. Coastal erosion due to heavy rains destroys mangrove forests and marine ecosystems and nesting areas for birds. Damage to the mangrove ecosystem also makes the land vulnerable to storm surges.
Infrastructure. Coastal sand erosion results to damage of properties and vegetation along the beach front. Schools and other buildings along the shoreline are prone to damage due to erosion. The municipal government will need additional budget for relocation, relief and rehabilitation of damaged public structures.
Water Source. Continuous, long rainy seasons and increase in volume of rain expose septic tanks to flooding and water sources to contamination from septic tanks and pollution. Areas near the coasts are open to salinization.

TROPICAL CYCLONE.

In the past 65 years (1951-2015), a slight decrease in the number of tropical cyclones (TCs) and a minimal increase in the frequency of every strong TCs (exceeding 170kph) were observed in the Philippine area of responsibility (PAR). These trends are projected to continue in the future. It has to be noted, however that the high year-to-year variations in the frequency of occurrence and intensity of TCs remain to be dominant in the future Philippine climate conditions.

CLIMATE EXTREMES (HEAVY MONSOONS RAINS, SUPER TYPHOONS)

Tropical cyclones which is also known as tropical depression and tropical storm, brings about storm surge, floods and strong winds. It has been observed that sea water slowly rises due to climate change. Santa Fe being an agricultural and ecotourism site is significantly affected by recurrent strong typhoons.

Economic. Tourists come to visit the island to bask in the sun and get involved in outdoor activities which they could not engage into during days with high precipitation. Beach resorts, hotels, travel inns and other accommodations as well as other local groups that cater to local and foreign guests are also affected by strong typhoons. With unpredictable weather pattern, farmers need to adjust their planting and harvesting schedule and decrease the number of planting occasions to avoid possible loss of revenue.

Social. Any effect on the livelihood of a family – farming, fishing, tourism services and other types of job located in areas affected by typhoons – also extends to education, quality of food intake, medical maintenance and provision of basic needs.

Environment. Once fresh water in deep wells is becoming salty or brackish through time. Forest trees and other vegetation are also damaged by strong winds and storm surges. Coconut trees planted in sandy areas are often uprooted as well exposing the land to storm surges during typhoons.

Infrastructure. During the PDRA, stakeholders from the local communities of Santa Fe identified sand erosion within the 20-meter easement zone to have resulted to homes and other infrastructure damages. Strong typhoons have been observed in the past years destroying poorly structured homes, buildings and infrastructures.

Water Source. Similar to continuous rain, increase in rainy season and typhoons, water sources are affected by saltwater intrusion, siltation and contamination from pollution and ecoli and coliform.

2. VULNERABILITIES

Climate change has both negative and positive impacts. IPCC (2007) defined adaptation as "*adjustment in natural or human systems in response to actual or expected climatic stimuli or their effects, which moderates harm or exploits beneficial opportunities*." This definition pointed out that adaptation can "moderate harm" or "exploit beneficial opportunities. Hence, in the Climate Change Adaptation Framework (CCCAF) both vulnerabilities and opportunities are highlighted.

It is realized that the achievement of the Santa Fe's vision is contingent to the health of the ecosystems – **coastal** and **marine and low-lying agricultural areas –** to which the resources vital to the livelihoods, sustainable tourism and survival of the population of Santa Fe depend. These ecosystems and natural

resources are crucial for the sustainability of two most important resources of the municipality – **freshwater, agricultural and residential lands, COASTAL AND MARINE ECOSYSTEM**. Contingent to this realization is the necessity to determine the vulnerabilities and adaptive capacity of the municipality.

The ***Local Government and Stakeholders of Santa Fe***identify the following vulnerabilities to climate-induced hazards can come from the following conditions:

- Its location being highly exposed to weather and climatic conditions, will always expose them to the onslaught of typhoons, storm surges and wave actions as well as heavy monsoon rains;
- The current pressures on water resources and exposure of ground water to salinity, the lowlands and the coastal/marine ecosystems;
- The current resource use practices and dependency of the population to water and the marine/coastal resources;
- Weak implementation of proper zoning and infrastructure planning that tolerates location of settlement, basic service facilities in hazard-prone areas;
- the non-implementation of water (easement and groundwater) and other environmental laws and regulation
- The vicious cycle of poverty and the poor to nil livelihood opportunities - INSUFFICIENT OR INAPPROPRIATE INSTEAD OF POOR TO NIL
- Uncontrolled population movement or migration resulting to urban sprawl in the coastal barangays with concomitant issues in waste management and increase in water pollution as a result of contamination

3. CLIMATE RISK STIMULI, IMPACT AND ADAPTIVE CAPACITIES PER CRITICAL SYSTEM OF CONCERN

Two key steps were undertaken as a basis of consolidating the analysis of climate risk stimuli, impact and adaptive capacities per critical system of concern. In March 2018 village level mapping was under-taken across the municipality, community representatives identified the most critical elements at risk to protect from climate stimuli and potential impacts under climate projections. A further impact chain analysis was under-taken with key municipal stakeholders in June 2018 focusing on elements at risk as identified by communities. The critical systems of interest in Santa Fe municipality as identified through these processes include the water system, coastal ecosystem and the associated (and dependent) livelihoods and social and health sectors upon which successful natural resource management and sustainable livelihoods are dependent on

DETAILED ANALYSIS OF VARIOUS SYSTEMS OF INTEREST

SYSTEM OF INTEREST: WATER SYSTEM

CLIMATE STIMULI:

Increased rainfall during the wet season, increased average temperature, extreme heat, decrease in average rainfall in the dry season (Feb-April), increased wind speed, extreme events: heavy monsoon rain, super typhoon, SLR

POTENTIAL IMPACTS

Biophysical: increase in soil erosion, salt water intrusion, reduce sources of water, contamination of underground water, *Salt water intrusion to water sources with increased demand and reduced recharge, Increased water acidity,* dry and salty wells, deepened existing wells, insufficient water supply, increased *contamination of water sources in mainland,*

decreased quality of underground fresh water levels, decreased soil fertility, siltation of the coastal areas

Socio-Economic: increase on cost of water per cubic meter, increase in water-borne diseases, increase in health-cost, increase in price of agro-industrial products, higher cost of establishment services, flooding in low lying areas and further contamination exposure, run off/low lands areas exposed to increased flooding,

ADAPTIVE CAPACITY:

Negative: open defecation, low awareness of ground water management and protection, water refilling stations (business model), unregulated drilling of wells, septic tanks constructed without bottom-sealed, industry located near water sources, developments near or in recharge areas

Positive: dug wells used for domestic purposes, installation of rainwater catchments, local desalination systems, Existing PO as strong partners for water management, assessment of water resources in Santa Fe (June 2018)

ADAPTATION MEASURES:

Zoning of recharge and catchment area, adaptation of the CLUP, declaration of protected areas, regulation of drilling of wells, rehabilitation of greenbelt zone, regulation of septic tanks, regular monitoring of water sources, IEC campaign, passing of ordinance, re-establishment of barangay nursery, strict implementation of water catchment policies, water recycling, installation of drainage systems with waste water treatment facility, construction of centralized septage management facility, water catchment facilities

VULNERABILITY ASSESSMENT

Based on the above-stated analysis, the result of vulnerability assessment is:

EXPOSURE is High
SENSITIVITY is High
POTENTIAL IMPACT is High
ADAPTIVE CAPACITY is Low

OVERALL VULNERABILITY ASSESSMENT - HIGH

SYSTEM OF INTEREST: SOCIAL SYSTEM

Climate Stimuli: *Increased rainfall during the wet season, increased average temperature, extreme heat, decrease in average rainfall in the dry season (Feb-April), increased wind speed, extreme events: heavy monsoon rain, super typhoon, SLR*

VULNERABLE GROUP OF PEOPLE: people living AND business establishments operating within the 40-meter easement zone, family's dependent to agri-fishery as main source of livelihood,

POTENTIAL IMPACTS

Biophysical: stagnant water (creating vector for mosquito and associated disease), flooding of agricultural, residential and business areas, decreased quality and quantity of fresh water zones, damage to productive lands and decreased soil fertility, increased in pest's infestation (army worms, locusts), siltation and coastal erosion

Socio-Economic: reduction in agricultural production, health impact: water-borne pulmonary diseases, potential incidents of heat strokes and skin rashes to children, hunger due to lack of food supply, poverty: low or no income, social: increase in crime incidents (robbery,

prostitution, theft), increase in prices of basic commodities, increase in number of unemployed youth, homes, businesses, *schools and public facilities exposed to SLR and coastal storm surge, possible need for relocation,* septic tank exposure to coastal flooding, water source contamination, / salinization, increased disaster risk from storms and typhoons, damage to lives, homes, livelihoods

ADAPTIVE CAPACITY:

Negative: poor enforcement of fishery laws, poor enforcement of solid waste management laws and other related laws, inappropriate livelihood-related training / skills

Positive: health insurance, agri-fishery insurance, organized DRR Response Teams at both establishment and barangay level, community-based savings, use of solar energy by some establishments and households, disaster preparedness plan in several barangays, resettlement of informal settlers, evacuation centers

PROPOSED ADAPTATION MEASURES:

Strict adherence to laws and ordinances, empowerment of people through CMDRR-CCA, promotion of 3R (reduce, re-use and recycle), establishment of early warning system, localization of livelihood initiatives and provision of financial assistance for starter kits

VULNERABILITY ASSESSMENT

Based on the above-stated analysis, the result of vulnerability assessment is:

EXPOSURE is Medium High

SENSITIVITY is High

POTENTIAL IMPACT is Medium High

OVERALL VULNERABILITY ASSESSMENT - MEDIUM HIGH

ADAPTIVE CAPACITY is Medium High

SYSTEM OF INTEREST: COASTAL ECOSYSTEM

Climate Stimuli: Increased rainfall during the wet season, increased average temperature, extreme heat, decrease in average rainfall in the dry season (Feb-April), increased wind speed, extreme events: heavy monsoon rain, super typhoon, *SLR*

Vulnerable resources: coral reefs, seagrasses, coastal zones, seaweeds, mangroves, fishery stocks

Vulnerable Groups: fishermen, (direct) whole population of Municipality of Santa Fe

POTENTIAL IMPACTS

Biophysical: reduce fish catch, coral bleaching, fish migration, fish kill (especially in cages), damaged corals and sea grass, ice-ice disease on seaweeds), mangrove exposed to salinization (specific to 2 types of mangroves?), siltation and extreme heat (requires species selection)

Socio-Economic: increased price of fishery products, decreased income, low productivity, low yield of seaweeds, increased poverty, longer fishing efforts, overfishing, SLR: impact on settlements, coastal flooding, septic tank exposure to coastal flooding, water source contamination, salinization

ADAPTIVE CAPACITY:

Negative: illegal fishing, poor implementation of waste management laws/ policies, continuous selling of endangered sea species, unregulated fish trading, seasonal fishing migration, low level of awareness of coastal communities on CRM issues,

Positive: mangrove and tree planting activities, sanctuary protection, seagrass protection, coastal clean-up drives, awareness on greenbelt zone, consciousness awareness activities on climate change, presence of properly managed MPAs, PO as strong partners,

PROPOSED ADAPTATION MEASURES:

Strict implementation of waste management ordinances, implementation of eco-green tourism, alternative livelihood, continuous coastal clean-up, mangrove planting activities, protection of mangrove areas and sanctuaries, zero-open defecation drive, strict implementation of the 20-m setbacks, establishment of MPAs, identification and regulation of docking areas, increase level of awareness of coastal communities on CRM issues (implementation of policies is a challenge), institutionalize fisheries law enforcement teams,

VULNERABILITY ASSESSMENT

Based on the above-stated analysis, the result of vulnerability assessment is:

EXPOSURE is Medium

SENSITIVITY is High **OVERALL VULNERABILITY ASSESSMENT - HIGH**

POTENTIAL IMPACT is High

ADAPTIVE CAPACITY is Medium

SYSTEMS OF INTEREST: LIVELIHOODS SYSTEMS –FISHING, FARMING AND TOURISM

Climate Stimuli: *Increased rainfall during the wet season, increased average temperature, extreme heat, decrease in average rainfall in the dry season (Feb-April), increased wind speed, extreme events: heavy monsoon rain, super typhoon, SLR*

Vulnerable Groups: 2,110 fishers (1,093 fishers or 52% at HR), 4,685 farmers (3,014 fishers or 64%) at HR out of the are under HR, tourism sector workers (225 island hopping operators, 540 drivers and __ employees of tourism establishments from 30+ resorts- verify with Tourism Dept)

Vulnerable resources:1,672 hectares of farmlands, 197 hectares of MPAs, water for farm-use, livestock, shell craft and handicraft

Potential Biophysical & Socio-Economic Impacts:

Negative: Tourism: increase in fire incidence, SLR and flooding in low lying areas, water quality/quantity impact to meet demand of tourism and service industry

Fishing and coastal livelihoods: fish migration, fish kill (especially in cages), coral bleaching and damaged corals and sea grass, ice-ice disease on seaweeds), mangrove exposed to salinization, siltation and extreme heat (requires species selection)

Agriculture: damaged crops due to heavy rainfall and dry spell, decreased quality and quantity of fresh water zones, damage to fruits and vegetables and trees, other forms of flora and fauna, increased in incidents of special pest infestation, decreased soil fertility, increased erosion, siltation on the coastal zones, death of livestock

Positive: Tourism: decrease in tourism arrivals, decrease in tourism activities, low income of tourism establishments, retrenchment of tourism establishment workers,

Fishing and coastal livelihoods: decrease in fish catch, *Pump boats exposed to SLR and coastal storm surge, Lower fishing productivity with less primary species available locally, fishers must travel further away for fish catch, Increased risk for fishers in traveling away from Santa Fe and unpredictable storm patterns, Lack of available coastal resources to maintain fishing activities Fish drying activities impacted by increased rainfall resulting in reduced productivity, impact on income Seaweed seedlings damaged as a result of strong and unpredictable winds*

Agriculture: *Low productivity on farms as a result of changes to precipitation seasons and intensity, long hot season damaging crops,* decrease in agricultural production, increase of water contamination from animal waste LIVESTOCK: EXPOSURE OF LIVESTOCK TO DISEASES DUE TO CHANGE IN CLIMATE

General: Increase in prices of basic commodities i.e. vegetables and fishes, *impact to low income and low food availability*

ADAPTIVE CAPACITY:

Negative: Negative: non-implementation of law prohibiting cutting of trees for charcoal/ buying and selling of charcoal, lack of capacity to apprehend illegal fishing violators, lack of clear 20-meter easement zones for tourism establishments/ resorts, continuous use of synthetic fertilizer in farming, non-implementation of RA 9003 on the part of the barangays

Positive: presence of policies/laws, MPAs, enforcement teams (though weak implementation, some alternative livelihood activities emerging, strong PO as partners

ADAPTATION MEASURES:

Promotion of climate-resistant farming technology, alternative livelihood, insurance policies for fishers and farmers, establishment of water impounding facilities, regulate fishing activities especially during spawning season, regulate entry of fishers from other municipalities/ intrusion of commercial fishing vessels, establishment of community-managed saving and loan schemes, promotion of seed banking, establishment of greenbelt zones (massive planting of beach forest trees in beaches and endemic trees in open farm fields (idle lands), promotion of green tourism, expansion of MPA and implementation of managed-access areas for fisheries

VULNERABILITY ASSESSMENT

Based on the above-stated analysis, the result of vulnerability assessment is:

EXPOSURE is High
SENSITIVITY is High
POTENTIAL IMPACT is High
ADAPTIVE CAPACITY is Medium

OVERALL VULNERABILITY ASSESSMENT – MEDIUM HIGH

In all analysis it is recognized that under adaptation capacities policies may be in place there but there is weak implementation and subsequent impact islimited therefore to enhance adaptive capacities it is necessary to focus on effective strategies to foster implementation and impact under existing policies.

4. BUILDING RESILIENCE FOR CLIMATE CHANGE ADAPTATION (CCA) STRATEGY

Tackling climate change requires mitigation[2] and adaptation measures to be identified. The CCAF focuses on municipal adaptation strategies

PROPOSED CLUP OUTPUT AND OUTCOME INDICATORS

The primary development goals of the Municipality of Santa Fe are to promote higher density development in the urban core, low income housing, pedestrian friendly urban design, and integrated network of open and green spaces and improve the quality of life of residents in these vulnerable communities.

This shall be done not just through physical improvements, like new or updated homes and improved or added infrastructure (paved streets, sidewalks, sewage connections, storm water drainage, street lamps, etc.), but also through social improvements by connecting people with safety and sanitation programs, training and education programs, open and green spaces. Program strategies also include implementation of smart growth policies for sustainable growth and development of Santa Fe which include promoting mixed use and high density development in and near the urban core.

Santa Fe will build on the idea of "complete communities", urban villages and human scale urban development. This goes beyond new urbanism on its emphasis on the nature of work and wealth creation in such communities.

VISION	OBJECTIVES/ GOALS	OUTPUT INDICATORS	OUTCOME INDICATORS
The Municipality of Santa Fe, a haven of white fine sand and crystal clear seawater, envisions of becoming a sustainable eco-agri- tourism center in Central Visayas	To promote higher density development in the urban core, low income housing, pedestrian friendly urban design, integrated network of open and green spaces and improve the quality of life of residents in these vulnerable communities.	Formulated a Municipal Tourism Development Plan, CLUP, CDP and other related plans	Increased number of establishments engaged in climate-smart technologies and practices
		Established integrated ecosystem management approaches for watershed and wetlands to reduce vulnerability to climate change and climate variability	Restored clean water quality in various water sources Decreased additional cost for purchase of bottled drinking water
		Ensured security of people, properties and natural resources along shorelines	Built seawalls, drainage and septage facilities Increased area for reserved and protected environment and ecosystem
	High and Sustainable Economic Growth	Established community-based marine protected areas (MPA) and strengthened multi-	Increased and fishery production and improved marine ecosystem condition

[2] The 4th Assessment Report of the Intergovernmental Panel on Climate Change (IPCC, AR4) defined mitigation measures as "anthropogenic intervention to reduce the anthropogenic forcing of the climate system; it includes strategies to reduce greenhouse gas sources and emissions and enhancing greenhouse gas sinks."

Comments from ICSC 1. Think of co-benefits of CCA/M 2. How do you propose to develop sustainable eco-tourism centers? Are you referring to mangrove eco-tourism? You are missing the low-hanging fruit here in establishing and maintaining these mangrove-related		sectoral MPA management council Established mangrove eco-tourism through reforestation with mangrove forest tree species and low-hanging fruits	Increased available sustainable, affordable, safe and healthy food on the table of every household Decreased cost of local market commodities due to increase in supply Decreased the population of unemployed
a peaceful, progressive, resilient and climate change adaptive town with well-developed infrastructure and balanced ecosystem, empowered by God-fearing and self-reliant citizenry,	Equal Access to Development Opportunities Comments from ICSC Elaborate CLIMATE-RESILIENT INVESTMENTS	Approved and implemented regulations and programs to support climate- resilient investments Promoted equality and equity in social services, employment and other opportunities	Decreased investors' cost of investments Reduced level of poverty, literacy and skills capacity Reduced level of unemployment and created livelihood opportunities to locals
	Effective Development Support Systems	Maintained well-managed, preserved and protected water resources and ensured accessibility of safe and potable water for all	Increased harvest during hot season and drought Installed / implemented water harvesting technologies i.e. impounding project
		Established permanent relocation housing for informal settlers living in high risk areas	Decreased cases of relocation/ evacuation cases during disaster and emergencies Increased area of shoreline vegetation and recreation
		Enhanced road maintenance to respond to climate change and climate variability	Improved farm-to-market transportation, infrastructure and increased income from agriculture
		Improved design of solar panels to withstand higher intensity storms	Decreased demand for electric power
managed by honest, transparent and dedicated, competent and		Developed participation, awareness and concern in local governance, environment conservation, human	More transparency, participation and accountability among stakeholders

gender-sensitive leaders.	welfare and economic development

LINKING LCCAP TO THE GOALS AND OBJECTIVES OF CLUP

The development of Santa Fe's LCCAP is based on series of impact chain analysis with barangay and municipal stakeholders whoidentified achievement of food, water and environmental security as approaches to cope up with, adapt and mitigate the impacts of climate change.

It further recognized that the overall vision and mission of the municipality shall only be achieved through the alignment of the LCCAP, MDRRM and development plans. The municipality has identified the following key strategies under LCCAP to attain this. Second column states how the LCCAP goal and objectives support the overall goals and objectives of the municipal government as stated in its CLUP.

UNDER LCCAP	UNDER CLUP
GOAL: to achieve food, water, and environmental security to cope with and adapt to the impact of climate change projections including extreme heat and extended dry season, and inundation of low-lying coastal areas	**GOAL: To promote higher density development** in the urban core, low income housing, pedestrian friendly urban design, integrated network of open and green spaces and **improve the quality of life of residents in these vulnerable communities.** - The CLUP goals of achieving greater degree in progress through more investments, infrastructures and housing combined with development of sites reserved for ecological preservation to uplift the lives of Santa Fe inhabitants specifically those who are most susceptible to the impacts of disasters and climate change is supported and balanced by the LCCAP goal by taking into consideration sustainable and regular supply of food and water plus a climate change resistant-environment through times. During an LCCAP dialogues, the LCCAP TWG claims that the municipality is not yet burdened by flooding except in once low ground level barangay since water naturally subside and seeps through their sandy ground. However, this issue of longer wet season and typhoons are expected to aggravate through the years hence adaptive measure should be planned ahead. Mitigation measures to reduce or avoid greenhouse gas emission. Communities have observed that properties built at 20-meter and more distance from the highest tide 10 years ago are now reached and being damaged by strong sea waves hence needs human relocation and more stringent policies on no-built zone areas. Sea level rise however could accelerate through time.

UNDER LCCAP	UNDER CLUP
OBJECTIVE NO. 1: Enhance and protect water quality and quantity to serve critical areas and needs of increased population and tourism in Santa Fe	**OBJECTIVES:** the CLUP aims for (a) high sustainable economic growth and (b) effective development support systems - The CLUP objectives could be achieved in agreement with the LCCAP's objective of improving, developing and protecting one of the basic needs for livelihood and survival – water and their sources. Increasing number of inhabitants and tourists will be requiring water to survive and enjoy the island. The expected longer rainy season will enable homes and communities to save water hence the need for projects that will aid in longer water retention and reservation for consumption/use during hot seasons. Water extraction from the ground are also affected by the decrease in temperature – making them salty for drinking and farming needs hence the need to develop a system that will help in restoring the land-based natural resources to sustain water quality and raise quantity. - Effective and efficient support systems like policies, plans, programs with proper facilities and equipment should be provided by the local government units based on the requirement of increasing population and tourism.
OBJECTIVE NO. 2: Strengthen social systems and structures to enhance health and sustainable livelihoods to cope with climate-induced risks	**OBJECTIVES:** the CLUP aims for (a) high sustainable economic growth, (b) equal access to development opportunities, and (c) provision of development support systems - The key players in Santa Fe's sustainable economic growth are the people, the environment and agriculture for tourism purposes. On the other hand, the LCCAP recognizes the need for transparency, accountability and participation among local stakeholders by supporting the reinforcement of unifying members of the local government and the community to participate in municipal development through providing first-hand information during dialogues and consultations. Communities being the most severely affected and primary victims during calamities and area development. Like in local area development, climate changes affects livelihood and other basic human needs (shelter, livelihood, water, power, public service, etc.) of local residents. - Recognizing the limitation in human and facilities of the local governments, every community's capacity for climate resiliency has to be developed and strengthened

UNDER LCCAP	UNDER CLUP
	though proper awareness, capacity-building and knowledge transfer. No person based on age, gender, religion and appearance should be deprived of any development opportunity, medical service and education since recovery from any impending hazard or impact caused by climate change shall still depend on every individual household's adaptive capacity. - Effective and efficient support systems like policies, plans, programs and economic, social and medical facilities and equipment should be provided by the local government units based on the demands in basic services, education and health. This shall determine the coping and adaptability capacity of the LGU and the communities.
OBJECTIVE NO. 3: Protect and enhance coastal resource management that the municipality depends on for sustainable food, livelihoods and tourism	**OBJECTIVES:** the CLUP aims for (a) high sustainable economic growth, (b) equal access to development opportunities, and (c) provision of development support systems - The only resource and area that sustains locals and tourism in Santa Fe is its environment and natural resources however clean fresh and sea water, air and soil conditions will still rely on how people manage, maintain and preserve them. CLUP's highly sustained economic growth will only be achieved if people have stable and viable sources of income and sustenance – farmers with abundant and high-valued crop production with low-cost inputs harvested according to their seasonal calendar and fishers with bountiful harvest of fishes and marine products at an average length of fishing time. - Farming and fishing are the major sources of income of local families in Santa Fe. Since climate change shall significantly affect the environment and resources for these types of livelihood, the local government aims to augment them with other alternative types of income-generating opportunities, insurance and other related assistance. More income means savings, better education and medical access. - If Santa Fe targets more tourist visits and with increasing population, it should be prepared for higher demand for agricultural and fishery products both for local sustenance and market distribution. The higher the number of people, the more resilient the communities and the LGUs should be.

Building upon theSanta Fe LCCAP objectives and actions, further analysis was applied using the Integrated Resource Management framework on climate, disaster and ecosystem to sharpen and support prioritizing CCA measures under the following goal

Goal*: to achieve food, water, and environmental security to cope with and adapt to the impact of climate change projections including extreme heat and extended dry season, and inundation of low-lying coastal areas*

It is recognized that through alignment of this climate change adaption strategy, the municipal disaster and development planning the municipality will be able to achieve its overall mission and vision.

The municipality identifies the followingobjectives to address this including

1. ***Enhancing and protecting FRESH water quality and quantity to serve critical services and needs of increased population and tourism in Santa Fe,***
2. ***Strengthening social systems and structures to enhance health and sustainable livelihoods to cope with impacts climate induced risks***
3. ***Protecting and enhancing Upland and coastal resource management that the municipality depends on for sustainable food, livelihoods and tourism***

The above goal and objectives set the priority direction of adaptation efforts for the municipality in the next 10 years.

The Climate Change Adaptation Framework planning engaged Government, local stakeholder groups and NGOs and technical resource agencies in developing a Climate Change Adaptation Matrix to summarize the direction and priority actions that would be taken based on the NCCAP and LCCAP. This required geographic analysis and targeting

The CCAF will be mainstreamed in government planning and programs; social, economic, environmental, institutional and infrastructure.

5. ADAPTATION STRATEGY ALIGNED WITH SECTORAL PLANNING AND PROGRAMS

Goal*: to achieve food, water, and environmental security to cope with and adapt to the impact of climate change projections including extreme heat and extended dry season, and inundation of low-lying coastal areas*

Objectivesand intervention strategies:

Objective #1 **Enhance and protect water quality and quantity to serve critical areas and needs of increased population and tourism in Santa Fe**
NOTE: ST – 1-3 years (2018-2021); MT – 4-6 years (2021-2027); LT - 7 and above (2027-2030)

OBJECTIVES	PPA	LT/MT / ST	RESEARCH	COLLABORATION PARTNERS	IMPT	EXPECTED OUTPUT	BURGETARY REQUIREMENT
Regulation of deep wells and dug wells	Enacting an ordinance regulating the digging of wells	ST	Water Resource study by CORDAID	SB, MENRO, OBO, MDRRMO, Water system personnel	1	1 ordinance for all 10 component barangays	50,000.00
	Profiling of wells					updating of water system	
	IEC campaign during FDS and Barangay Assemblies on saltwater intrusion			DSWD-LGU links, MENRO, MDRRMO		58 *puroks*	IEC –200,000.00 Allowance-1,200,000.00
	Enactment of local building code with inclusion of mandatory rain catchment systems			SB, OBO, MPDC		1 ordinance for all 10 component barangays	50,000.00
	Strengthening and improvement of the existing water system services and additional (at least 2) water source/ facility			DILG, Provincial Government, LCEs and municipal officials		10 barangays	50,000,000.00

OBJECTIVES	PPA	LT/MT / ST	RESEARCH	COLLABORATION PARTNERS	IMPT	EXPECTED OUTPUT	BURGETARY REQUIREMENT
	Develop an Island-wide water protection plan					1 mainland, 1 island wide Water Protection Plan for 3 municipalities	500,000.00
	Island-wide Water Protection establishment and implementation	LT					5,000,000.00
Rehabilitation of Greenbelt Zones	Coordinate with lot owners for tree planting projects	ST	Research from DA/EMB/BFAR, Rehabilitation of Marine Habitat: Study by (ZSL)	Agriculture, MENRO, Barangay Captain/ Officials of Talisay, Ocoy & Pooc, SB, Brgy officials of 7 barangays with pending MPA declarations	2		100,000.00
	Expansion of area covered with Mangroves (Periodic planting and regular monitoring)	MT					
	- Conduct research on strategies to prevent coastal erosion	ST					
	- *Planting of beach forest trees at coastal areas (Marikaban, Ocoy, Pooc)*	MT					

OBJECTIVES	PPA	LT/MT / ST	RESEARCH	COLLABORATION PARTNERS	IMPT	EXPECTED OUTPUT	BURGETARY REQUIREMENT
	Enhancement of municipal ordinance to include the MPA of the remaining 6 barangays	ST					
Strict implementation of the Sanitation Law and regulation of installation of septic tanks	New building permit applicants will be provided with DENR-approved designs for Septic Tanks	ST		RSI, OBO, MENRO, JIT (c/o Mayors Office, PBSP	1	400 + establishments in all 10 barangays	
	Periodic inspection of commercial establishments for compliance of health and sanitation rules and regulations	ST					500,000.00
	Improve management of sewage/septic systems and well inspection of household and commercial establishments	MT-LT					10,000,000.00
	- *Regulations for existing sewage/septic system*						

OBJECTIVES	PPA	LT/MT / ST	RESEARCH	COLLABORATION PARTNERS	IMPT	EXPECTED OUTPUT	BURGETARY REQUIREMENT
	- *IEC for household level*						
	Strengthen the capacity of Joint Inspection Team of Santa Fe LGU	ST				capability-building - 1 training per year for the JIT - at least 15 persons	50,000.00
	Require all barangays to establish barangay and school nurseries through memo	ST		LCE, MAO			300,000.00
Installation of proposed drainage systems and waste water facilities	Implement "No ECC-No Renewal" policy for business establishments	ST		DENR, OBO, MPDC, JIT, MENRO, BPLO and DILG	2	1 ordinance for all 10 barangays	50,000.00
	Establish Public-Private Partnership for Water Treatment Facility (MOA)	MT		Private Sector, business owners, proprietors, SB, LCE, BPLO, SAFETEA	1	1 MOA	5,000.00
	Water management and protection council	ST				1 Water Management and Protection Council	100,000.00
	Land tenure review for existing ownership of	ST		Provincial LGU			200,000.00

OBJECTIVES	PPA	LT/MT / ST	RESEARCH	COLLABORATION PARTNERS	IMPT	EXPECTED OUTPUT	BURGETARY REQUIREMENT
	water-source (Balidbid)						
	Regulation of spring and surface water					1 ordinance	50,000.00
	Regulation/possible closure and inspection of commercial scale poultries and piggeries	ST-MT		LCE, BPLO, JIT and SB		1 ordinance	50,000.00
	- Biogas digester for livestock production	MT					
	Shoreline rehabilitation and management			LCE, SB, MPDC and MDRRMO		1 ordinance	50,000.00
TOTAL BUDGETARY REQUIREMENT							**68,405,000.00**

Objective #2: **Strengthen social systems and structures to enhance health and sustainable livelihoods to cope with climate induced risks.**

OBJECTIVES	PPA	LT/MT/ ST	RESEARCH	COLLABORATION PARTNERS	IMPT.	EXPECTED OUTPUT	BURGETARY REQUIREMENT
Strict Implementation of the Fishery Laws	Capacitate coastal law enforcement personnel, encourage fish warden volunteers	ST	Coastal Law enforcement Tañon Strait protected seascape	DA, PNP/ Maritime Police, Bantay Dagat, BFAR, DENR	1		50,000.00
	Establish a Municipal Coastal Resource Management Office	MT				1 for the entire municipality	
	Create a position for "Municipal Fisheries Officer" to oversee coastal resource management					1 for the entire municipality	1,000,000.00

OBJECTIVES	PPA	LT/MT/ ST	RESEARCH	COLLABORATION PARTNERS	IMPT.	EXPECTED OUTPUT	BURGETARY REQUIREMENT
	Equip coastal law enforcement personnel with PPEs and other paraphernalia	ST		- Request from the Provincial LGU			3,000,000.00
	Procurement of 8-seater motorized pump-boat for Bantay Dagat personnel	ST					1,5000,000
Strict implementation of Solid Waste Management and other Laws	Issuance of citation tickets for violators of RA 9003 (Solid Waste)	ST	RA 9003				
	Continuous IEC of RA 9003 for all sectors-households and community-driven solid waste man	ST-LT					1,000,000.00
	Procurement of Compactor	ST					3,000,000.00
	Procurement of Multicab /Dump truck for waste collection per barangay						1,500,000.00
	Establishment of MRF per barangay and tourism establishment						(to be shouldered by the barangays and establishments)
Establish community groups and empower them through CMDRR-CC	Conduct TOT for CMDRR-CC	ST	**From MDRRMO	MDRRMO, Partner NGs (CORDAID, RRU-AC, PBSP), Provincial Government	2		500,000.00
	Roll out of trainings at the purok level	LT			2		
Promote 3R (reduce, re-use and recycle) in support to water management and livelihood on ecosystem	Establish Reward System on RA9003	ST-LT			2		1,000,000.00
To establish an Island-wide platform of cooperation for	Conduct island-wide stakeholders mapping	ST-LT					
	Conduct follow-up activities including consultations						500,000.00

OBJECTIVES	PPA	LT/MT/ ST	RESEARCH	COLLABORATION PARTNERS	IMPT.	EXPECTED OUTPUT	BURGETARY REQUIREMENT
joint action on water/ coastal/ health/ livelihood protection	Formation of the island-wide platform						
Health promotion campaign on climate, water and health	Creation of a resolution regarding the "Zero-open defecation drive"	ST		MHO			50,000.00
	Support to Zero Open defecation						2,100,000.00
TOTAL BUDGETARY REQUIREMENT							**14,300,000.00**

Objective #3: **Protect and enhance coastal resource management that the municipality depends on for sustainable food, livelihoods and tourism**

OBJECTIVES	PROGRAM, PROJECTS AND ACTIVITIES	LT/MT/ ST	RESEARCH	COLLABORATION PARTNERS	IMPT.	EXPECTED OUTPUT	BURGETARY REQUIREMENT
Strict implementation of the War on Waste Project of the municipal government	a. IECs on household level	ST-LT	Ordinance, SWM plan, SWM code, RA 9003	MENRO, SAFETEA, CordAid, DENR – EMB, Pantawid and MCCTs, KALIPI	1		200,000.00
	b. SWM on commercial establishments						
	c. Cleanup drives (thrice a year)					Clean-up Drive 3x/ year	30,000.00
	d. Implementation of "no plastic day"						5,000.00
	e. Strengthening of Task Force WOW						200,000.00
	f. Solid waste processing facility						8,000,000.00
	g. Conduct a Waste Analysis and Characterization Study (WACS)						500,000.00
Implementation of Greenbelt Zone	**BEACH FOREST ZONE**		DENR study on beach forest, ordinance, water code, Beach Forest Study by ZSL	MENRO, OBO, MAO/DA, DENR, BPLO, Provincial Government, Tambuyog, CordAid,	1		
	a. Identification/Mapping of beach forest zone						100,000.00
	b. Conduct a beach forest study of Santa Fe	ST					50,000.00

OBJECTIVES	PROGRAM, PROJECTS AND ACTIVITIES	LT/MT/ ST	RESEARCH	COLLABORATION PARTNERS	IMPT.	EXPECTED OUTPUT	BURGETARY REQUIREMENT
	c. Consultation on barangay level	ST		SB Council, ZSL, PENRO			100,000.00
	d. Enactment of ordinance declaring beach forest zones	ST					10,000.00
	e. Establishment of nursery for forest trees	MT				10 barangay nurseries	400,000.00
	f. Conduct Massive tree planting initiatives at the Barangay level on prescribed beach forest trees based on landscape	MT				3 barangays	150,000.00
	g. Monitoring of the seedlings planted	MT-LT					20,000.00
	RE-CHARGE AND WATER CATCHMENT ZONE		Ordinance	MENRO			
	a. Identification/Mapping of re-charge and water catchment zone	ST	Water code	OBO			20,000.00
	b. Consultation on barangay level	ST	DENR – EMB	MAO / DA			100,000.00
	c. CLUP inclusion of re-charge and water catchment zone	ST		DENR			
	d. Ordinance adopting the CLUP	ST		BPLO			10,000.00
	e. Establishment of nursery for forest trees	ST		Province			150,000.00
	f. Massive tree planting	ST		Tambuyog			50,000.00
	g. Monitoring of the seedlings planted	ST-LT		Water Systems/ associations			20,000.00
	h. Close monitoring and regulating of establishments within 100 meters radius away from re-charge and water catchment zone	ST-LT		SAFETEA			20,000.00
	MANGROVE ZONE						
	a. Identification/Mapping of mangrove zone	ST				3 barangays	15,000.00
	b. Information campaign	ST					20,000.00

OBJECTIVES	PROGRAM, PROJECTS AND ACTIVITIES	LT/MT/ ST	RESEARCH	COLLABORATION PARTNERS	IMPT.	EXPECTED OUTPUT	BURGETARY REQUIREMENT
	c. Establishment of nursery for forest trees (seed banking)	ST				3 barangays	150,000.00
	d. Massive tree growing	ST-LT					100,000.00
	e. Monitoring of the seedlings planted	ST-LT					20,000.00
	f. Formation of watch group	ST					20,000.00
	g. Strengthening/ capacity building of watch group in collaboration with barangays	ST					50,000.00
	MARINE PROTECTED AREA NETWORKS			RARE Philippines, Tambuyog, MAO and BFAR			
	a. Identification/ Mapping of MPAs (Participatory Coastal Resource Assessment)	ST					100,000.00
	b. Submission for review/ comments/ approval of MPAs by the SP	ST					20,000.00
	c. Publication of MPAs in the newspaper of general circulation	ST					20,000.00
	d. Strengthening/capacity building of *bantay-dagat* task force					20 fish wardens	50,000.00
	e. Provision of logistic support (search light, binoculars, megaphones)	ST					150,000.00
	f. Provide incentives to fish wardens					20 fish wardens	480,000.00
	TOURISM ZONE						
	Rehabilitation of tourism zone specifically due to coastal erosion (Talisay, Hilantagaan, Ocoy)	LT					

OBJECTIVES	PROGRAM, PROJECTS AND ACTIVITIES	LT/MT/ ST	RESEARCH	COLLABORATION PARTNERS	IMPT.	EXPECTED OUTPUT	BURGETARY REQUIREMENT
	a. Establishment of breakwater	ST					20,000,000.00
	b. Redesign structure of the port/ pier	ST					300,000,000.00
	c. Plant beach forest	ST					150,000.00
	d. Amendment of the "no sand extraction" policy						20,000.00
	Green tourism program						
	- Enactment of ordinance designating and declaring docking, navigational zones, public beaches and access roads	ST					20,000.00
	- Enactment of ordinance on carrying capacity of Santa Fe tourism area	LT					20,000.00
	- Conduct study on coastal zoning and Inclusion of coastal zoning on CLUP	ST					50,000.00
	- Promotion and monitoring of "no plastic straw"/ "no plastic day"	ST-LT					50,000.00
	- Promotion for environment friendly and climate resilient structures ie. solar powered establishments	ST-MT					100,000.00
Increase production and promotion of alternative livelihood with CLIMATE SMART farming technologies	a. Profiling of vulnerable farmers	ST		MAO, PCIC, Provincial Government	1		100,000.00
	b. Full implementation of FSTP program (Phase 1-3)	ST-LT					2,000,000.00

OBJECTIVES	PROGRAM, PROJECTS AND ACTIVITIES	LT/MT/ ST	RESEARCH	COLLABORATION PARTNERS	IMPT.	EXPECTED OUTPUT	BURGETARY REQUIREMENT
	c. Vegetable climate-SMART at Kinatarcan Island and replication in mainland Santa Fe	ST-LT				4 mainland barangays	500,000.00
	d. Crop and livestock insurance	ST-LT				10 barangays	100,000.00
	e. Organize farming technician groups	ST				5 barangays, 25 farmers	50,000.00
	f. Livestock dispersal	ST				6 barangays	750,000.00
Promotion of the use of solar power	a. Energy needs assessment	MT-LT			3		50,000.00
	b. Accepting application/ proposal for solar power projects						20,000.00
	c. Engagement on PPPs with solar power providers						
OTHER SUPPORT ACTIVITIES	Establishment of Climate Information Centers in the barangay level	ST					1,000,000.00
	Organize and capacitate Rescue Teams for Tourism (municipal level)	ST					5,000,000.00
TOTAL BUDGETARY REQUIREMENT							**341,310,000.00**